

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Tomohiro Kawase et al Art Unit : 1765
Serial No. : 09/824,965 Examiner : Robert Kunemund
Filed : April 3, 2001
Title : METHOD OF PREPARING GROUP III-V COMPOUND SEMICONDUCTOR
CRYSTAL

Commissioner for Patents
Washington, D.C. 20231

SECOND INFORMATION DISCLOSURE STATEMENT

Applicant submits the references listed on the attached form PTO-1449, copies of which are enclosed.

Applicants have requested an interference with U.S. Patent No. 6,045,767 ("767 patent"). Items AA, AB and AO on the enclosed form PTO-1449 were cited in the prosecution of the '767 patent.

The following reference is listed on the face of the '767 patent:

"Semiconducting Gallium Argenide [*sic.*] Single Crystals";
Yamamoto, et al., Japan. Kokai Tokkyo Koho, 5 pgs. (Abstract only), 1989.

We believe that this is an incomplete reference to an abstract of Japan Patent Publication No. 6-37833, published Feb. 8, 1989, that is already cited as a reference in the '622 patent, which is the basis for the present reissue application.

Reference 803593A1, listed on the face of the '767 patent is the publication of the European counterpart to the present application.

Items AT, AU and AV on the enclosed form PTO-1449 are copies of documents which were found in the USPTO file of the '767 patent, but were not cited on the face of that patent.

An IDS was filed in the present reissue application by mail on or about December 14, 2001; however, a recent check of the file of this reissue application revealed that it had not been entered in the file. Items AL, AQ, AR and AS, identified and submitted with that first IDS are listed again on the enclosed form PTO-1449 and are being resubmitted at this time. Those items were brought to the undersigned's attention by Michael A. Molano, Esq., an attorney representing AXT Inc. (formerly American Xtal Technology), the assignee of the '767 patent.

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AXT contends that the three articles (items AQ, AR and AS) together show obviousness of one or more claims of the present application. Applicants disagree.

AXT also has suggested that reference AL, Kremer European patent publication EP 0,417,843 A2 ("Kremer EP"), is more relevant than Kremer, U.S. Patent No. 4,999,082 ("Kremer US"), which was cited in the prosecution of the parent of the present reissue application. (The claims of both SEI's '622 patent and AXT's '767 patent were allowed as patentably distinct from the Kremer U.S. patent.) AXT notes that the material under the heading "EXAMPLE 3" of Kremer EP does not appear in Kremer US. In particular, AXT contends:

[T]he Kremer EP publication shows boron oxide, solid carbon and that the two are related. Boron oxide in the form of B_2O_3 is disclosed in two parts of the Kremer EP publication: (a) p. 4, line 33 and (b) p. 7, line 55. Solid carbon is disclosed in Example 3 (p. 8, line 26). The two are "related" because:

At (b), the B_2O_3 is disclosed as part of Example 2 that, ... "is the same as the method" of Example 3.

The publication to B_2O_3 in Example 2 is immediately before the publication to "graphite powder (carbon)," separated only by about thirty (30) lines.

Example 3 specifically refers to Example 2 stating "the method described in Example 2 was used" with a number of modifications.

That position is wrong, for the reasons stated below. Kremer EP does not anticipate or make obvious any claims of SEI's '622 patent or its reissue application because it does not disclose, teach or suggest any of the claimed combinations.

1. Non-Anticipation by Reference AL (Kremer EP)

Kremer teaches the use of a high melting point powder, preferably boron nitride, to coat the crucible in the methods of his invention. In some preferred methods, Kremer provides carbon doping, using a carbon source within the sealed ampoule, separate from the crucible.

The method of EXAMPLE 1 discloses the use of boron nitride without carbon doping.

Two subjects are discussed under the heading EXAMPLE 2 in the Kremer EP publication. One is a previously known method, such as LEC using boron oxide, in which the carbon source is graphite parts of the furnace. (Page 7, lines 52-55) The other is Kremer's Example 2. The sealed ampoule, carbon doping method of Example 2 specifically incorporates by reference the method of Example 1. (Page 8, lines 6-7) It employs Kremer's carbon source separate from the crucible. Example 2 does not use boron oxide. In that Example, boron nitride or similar powder is used, per Example 1. (Page 7, line 56 - page 8, line 10) Persons skilled in the art would understand that no boron oxide would be used when boron nitride is used.

Two subjects also are discussed under the heading EXAMPLE 3 in the Kremer EP publication. First is Kremer's Example 3, a modified version of Example 2 (not of the LEC prior art) which also uses the separate carbon source within a sealed ampoule. (Page 8, lines 15-22) Finally, Kremer EP has a comparative example, "outside the current invention." The comparative example uses an unspecified amount of graphite powder (carbon) in the crucible. (Page 8, lines 23-30) It is a modification of Example 3 and, therefore, used boron nitride, not boron oxide.

The method of Kremer's Example 3 was used in making eight ingots A-H. (Page 8, lines 15-22). The comparative example was used for making ten ingots I-R. (Page 8, lines 26-27) Kremer EP goes on to discuss how the data in Table II demonstrates the superiority of the Kremer process over the comparative example process. (Page 8, line 28 - page 9, line 28)

Kremer EP does not disclose any of the claimed combinations.

For a prior art reference to anticipate a combination claim, every element must be identically shown in a single reference and must be arranged as in the claim under review. *See In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). The comparative example of Kremer EP, however, does not disclose the claimed combination of any of the claims of the reissue application. For example, while the comparative example does refer use of graphite powder (carbon), it does not disclose the claimed combination using B_2O_3 .

It would not be proper to combine two different parts of a publication to form an anticipatory reference unless the two parts are related. *See Ecolochem, Inc. v. Southern Cal. Edison Co.*, 227 F.3d 1361, 1368-69 (Fed. Cir. 2000). The comparative example of carbon powder-doped ingots I-R were made by a method similar to Kremer EP's Example 3, which in

turn states that it is the same as the method of Example 2, with certain, specified modifications. Example 2 also lacks any disclosure of B_2O_3 . While the prior art discussions in the Kremer US patent and Kremer EP application do refer to B_2O_3 , there is no statement in either reference disclosing, teaching or suggesting a combination including use of both B_2O_3 and carbon powder placed in the crucible. Therefore, that Kremer EP does not anticipate any claims of the reissue patent.

2. Non-Obviousness

Kremer EP also does not teach or suggest any of SEI's claimed combinations and, therefore, those claims are not obvious from Kremer EP under 35 U.S.C. § 103(a). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or motivation supporting the claimed combination. See *Ecolochem*, 227 F.3d at 1372-75. The claimed inventions of the present reissue application are not taught or suggested by the Kremer EP application, nor is there any motivation to combine the distinct and separate disclosures in that reference to make the claimed combinations of the reissue application.

References which teach away from the claimed combination also indicate the non-obviousness of that combination. See *Ecolochem*, 227 F.3d at 1373. The teaching of the Kremer EP publication, that the crucible should be coated with boron nitride powder (instead of using B_2O_3), teaches away from the combinations of the present reissue application claims. The criticism of using B_2O_3 in both Kremer references also teaches away from combining B_2O_3 with the carbon powder comparative example in Kremer EP. That confirms that Kremer EP does not incorporate use of B_2O_3 by reference into that comparative example and, therefore, that the combinations of the reissue claims are not obvious from Kremer EP.

The Kawase et al. Abstract and Article

Also submitted herewith are copies of two Kawase et al. documents, for the purpose of clarification. The Abstract (item AW) was published at the time of a conference, April 29 - May 3, 1996, and the longer paper (item AX) was published later in 1996. The paper was cited in the prosecution of the '622 and '767 patents. Neither is prior art with respect to the present reissue

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application because (1) it describes the present Applicants' work and (2) the present Applicants have claimed the priority of their earlier Japanese patent application 08-107009, filed April 26, 1996. A copy of that priority application and a translation are of record in the file of the '622 patent.

This statement is being filed before the receipt of a first Office action on the merits.
Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted.

Date: January 22, 2001

John B. Pegram
Reg. No. 25,198

Fish & Richardson P.C.
45 Rockefeller Plaza, Suite 2800
New York, New York 10111
Telephone: (212) 765-5070
Facsimile: (212) 258-2291